

## NEW CLASSIFICATION OF CONSTRUCTION COMPANIES: OVERHEAD COSTS ASPECT

Rasa Apanavičienė<sup>1</sup>, Ala Daugėlienė<sup>2</sup>

Department of Civil Engineering Technologies, Kaunas University of Technology,  
Studentų g. 48, LT-51367 Kaunas, Lithuania

E-mails: <sup>1</sup>[rasa.apanaviciene@ktu.lt](mailto:rasa.apanaviciene@ktu.lt) (corresponding author); <sup>2</sup>[ala.siskina@ktu.lt](mailto:ala.siskina@ktu.lt)

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**Abstract.** The traditional classification of construction companies depending on the number of employees is not appropriate when analysing the competitiveness of construction companies. The collected data of Lithuanian construction companies was analysed by applying statistical methods and the construction companies were classified into competitiveness classes according to the relative value of the overhead costs. The new classification provides the basis for economical evaluation of the construction companies and modelling of their competitiveness in regard to the value of overhead costs as well as applying the competitive advantages for the estimation of construction bidding price.

**Keywords:** competitiveness, overhead costs, classification of companies, construction company.

### 1. Introduction

The issues of a construction company's competitiveness arise constantly during the preparation of construction bids and participating in public tenders, while the dynamically growing competitive environment forces companies to pay more and more attention towards the implementation of marketing practices (Jaafar *et al.* 2008). This aims at preserving the company's positions in a specific part of the market and applying its competitive advantages in the regional market. The development of competitiveness involves the identification of its factors and their appearance circumstances (Brauers, Zavadskas 2010; Rutkauskas 2008). On the other hand, the assessment of the competitiveness of the construction company in the market and the evaluation of its competitive abilities is a very hard task and one of the most important features of efficient management.

In marketing sources the competitiveness of a company is defined as the ability to adapt to volatile market competition conditions (Kuvykaitė 2001). The competitive abilities of a construction company can be evaluated in terms of its competitive price, quality, supplementary services and other factors. However, the essential factor of a construction company's competitiveness is bidding price, since it is the main criterion for the clients in selecting contractors (Plebankiewicz 2010; Turskis 2008; Zavadskas *et al.* 2008). Competitive advantages of construction bidding price can be obtained in two ways, i.e. by modelling direct and indirect costs. The minimization and optimization of direct costs of construction are explored by the researches in many different countries, but the increasing of competitiveness through the modelling

of indirect costs of construction has not been investigated properly (Zavadskas *et al.* 2010).

In an environment of free market economics the management of company's expenses constitute a starting point for success; thus the effective way to increase the company's competitiveness under highly intense competition in construction market with declining building contractors' profits and shrinking market shares is to control the costs of production and business. However, building contractors often fail to evaluate adequately the actual overhead costs, which represent the largest part of indirect costs of construction. Consequently, an inappropriate evaluation of overhead costs may bring about either too high or too low overhead costs, which, in turn, may undermine the competitiveness of building contractors, or may even force some construction companies out of business.

According to the Lithuanian certified recommendations for construction cost estimation the overhead costs of a construction company are estimated as the percentage of direct costs or direct labour costs. However, the value of overhead costs, determined in this way, is not a great asset in sense of a construction company's competitiveness. Such overhead costs reflect neither the competitive advantages of a construction company, nor its management system, nor the use of infrastructure assets. There is a need in method for the assessment of the construction company competitiveness in regard to its overhead, which could be applied to predict the potentials for the reduction of bidding price and the improvement of operational efficiency of company's management system and its infrastructure. The paper presents a new classification of construction companies according to their overhead costs and a relevant and innovative methodology for

evaluating the construction company's competitiveness in regard to overhead costs.

## 2. Relevant literature on construction company overhead costs

Overhead costs of a company are an important research object for construction economics scientists and analysts. Relevant researches on overhead costs have been carried out for several decades; they investigate a lot of different problems related to the evaluation of the company's and project overhead costs, their allocation to different projects, specific jobs or other cost centres, actual overhead costs coverage and numerous other factors. All research works on overhead costs evaluation can be divided into four main research trends (Šiškinė *et al.* 2009). The groups of research on overhead costs are presented in Table 1.

**Table 1.** Groups of research on overhead costs

No.	Research group	Authors
1	Construction contractor surveys, analysis of situation and statistical research on the understanding of the overhead costs concept as well as categorization of indirect costs, the implementation of evaluation, planning and control in practice	Pfaff (1994), Holland, Hobson (1999), Luther, Robson (2001), Assaf <i>et al.</i> (2001), Chan, Lee (2003), Leung <i>et al.</i> (2005), Dikmen <i>et al.</i> (2007), Enshassi <i>et al.</i> (2008), Elazouni (2009)
2	Analysis of construction delays vs. overhead costs volume	Taam, Singh (2003), Adey <i>et al.</i> (2004), Zayed <i>et al.</i> (2005), Błaszczyk, Nowak (2009)
3	Analysis of the construction company's overhead costs distribution and allocation	Kim, Ballard (2001, 2002), Shakantu <i>et al.</i> (2003), Chen <i>et al.</i> (2008), Kee (2008)
4	Analysis of fixed expenses recovering	Schiffers (1979), Sehlhoff (2001, 2003), Drees, Paul (2002), Meinen (2005), Horngren <i>et al.</i> (2006), Lea (2007), Ginevičius (2007), Kachaner (2009)

Research papers in the first group reflect the overhead costs evaluation and management experience of construction contractors from various countries. Scientists carry out contractor surveys and statistical analysis of the results in order to determine whether construction contractors correctly understand the definitions of indirect and overhead costs as well as whether appropriate costs evaluation methods and costs allocation techniques are applied.

Research in the second group involves the impact of construction project delays on the company's overhead costs refund and its operational efficiency. In such cases the construction company does not suffer financial losses directly, but the recovering of overhead costs from company's income planned by contractor is undermined.

Researches in the third group involve the analysis and evaluation of company's overhead costs distribution methods and allocation techniques. Such scientific researches are particularly essential for large companies that work in the field of construction project management and coordinate the work of numerous subcontractors. Traditionally, company's overhead costs are distributed to different projects according to resource-based costing and volume-based allocation. A further field in this group of research is the development of new overhead costs allocation methods or the improvement of those already available, in regard to the evaluation of their advantages and disadvantages.

The fourth group of research in the field of overhead costs involves the analysis of fixed costs evaluation and recovering. For several decades these issues have received exclusive attention of the researchers. Scientific publications discuss the situation in the construction market as unfavourable for contractors and the need for applying a market-based estimation system. Construction companies are advised to use the so-called contribution margin accounting, which provides the categorization of contractor's costs into variable and fixed, and is a very efficient tool for cost planning.

Different researches on overhead costs investigate a lot of diverse problems related to the evaluation and allocation of overhead costs to different projects and cost drivers. But there is no systematic approach to the evaluation of a construction company's competitiveness in regard to its overhead costs.

## 3. Lithuanian construction companies survey and construction overhead costs data analysis

The construction company's competitiveness in regard to its overhead costs can only be determined after researching on the homogeneous set of construction companies (Gajzler 2010). A three-year data from 30 construction companies performing general construction work packages in the central regions of Lithuania's construction market was gathered. The structure and operational volume of these companies are analogous; therefore, the set of the companies responding to survey is considered to be homogenous. The surveyed companies employ from 20 to 250 employees, and their annual volume of construction operations ranges from 0.9 to 21.8 million LTL. The management staff in the examined companies ranges from 3 to 24 employees, the size of buildings facilities is from 168 to 2000 m<sup>2</sup>, and the annual overhead costs range from 1.0 to 1.36 million LTL.

According to the Lithuanian certified recommendations for construction cost estimation, a construction company's overhead costs consist of four main categories: head office expenses (such as expenses of building facilities, clerical, utilities and proceeding taxes and fees), common use transport expenses (costs for amortization, rental and fuel, as well as taxes), and salaries of head office employees and proceeded from them taxes. The structure of overhead costs, adopted in Lithuania, is shown in Fig. 1.

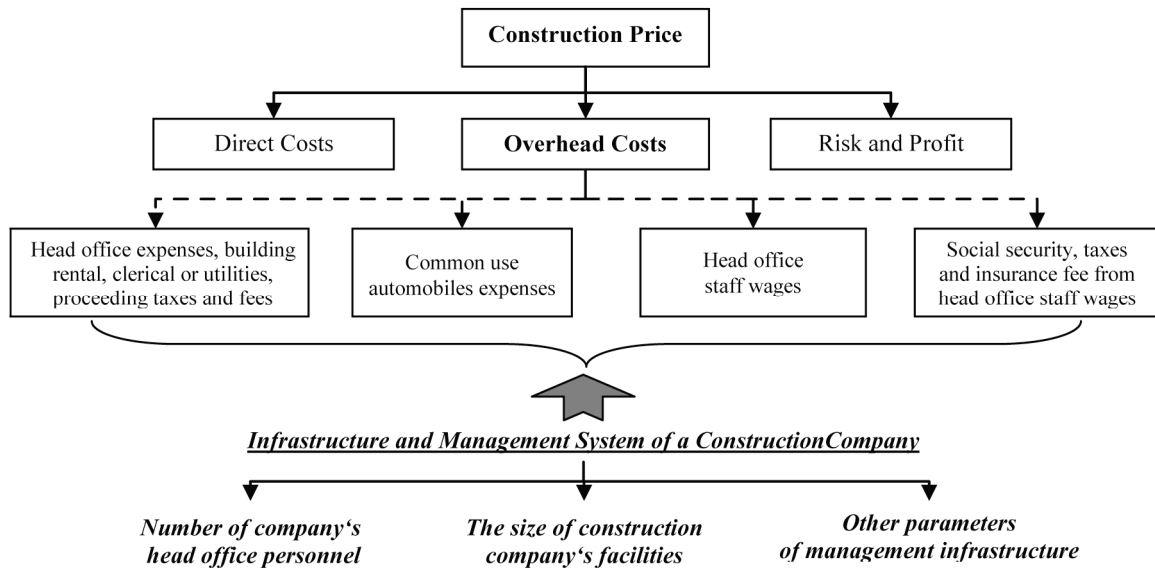


Fig. 1. The structure of a construction company's overhead costs, adopted in Lithuania

Since the structure of overhead cost is quite strictly defined, it is possible to select adequate criteria and parameters which allow analysing the construction company's competitiveness in the market in relation to its overhead. Thus, three main groups of costs and these costs' centres can be distinguished:

- Administration costs, which depend on the number of head office employees;
- Building facility costs, which depend on the size of buildings owned;
- Other overhead costs, which depend on numerous factors.

Administrative costs of the company include head office staff wages, social insurance taxes and administrative expenses (mail, communications, office, business trips, transport and other expenses). The buildings facilities costs consist of costs for buildings amortization and bank loans, exploitation and repair expenses, rent, insurance, lighting, heating, plumbing, sewage disposal, accommodation cleaning and other expenses. The other components of the overhead costs can not be defined by a certain parameter or factor.

Since the overhead costs of a construction company reflect its management system and infrastructure expenses, the magnitude of overhead costs directly depends on the size of the company. The bigger the company is the bigger construction projects it can perform. Big construction projects require a lot of internal resources of the company, thus, the bigger amount of overhead costs need to be covered. Therefore, in further analysis and processing of statistical data, relative rates of the calculated overhead costs, administration costs and building facilities costs were used. These relative rates of overhead costs are calculated as the part of costs per unit of operation volume, expressed in monetary terms, i.e. 1 million Lt. This rate is considered to be an adequate parameter for providing the evaluation of construction companies and their classification according to the competitiveness in regard to overhead costs.

The analysis of the results of construction companies' survey revealed that the adopted classification of construction companies into small, medium and large enterprises depending on the number of employees to be not appropriate when analysing the competitiveness of construction companies. The range of overhead costs values for companies, belonging to the same class, is very wide. It is presented in Fig. 2.

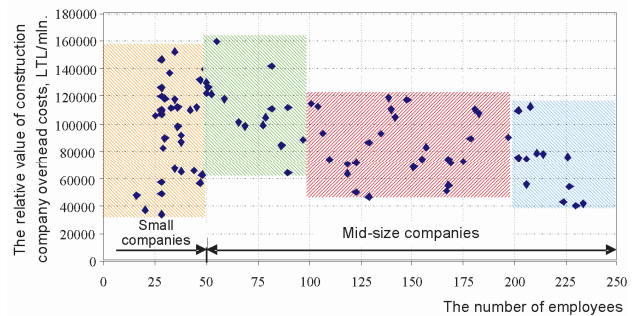


Fig. 2. Classification of Lithuanian construction companies and the scatter of their overhead costs values

Consequently, the assessment of competitiveness of the companies according to such classification is not relevant. The overhead costs relative rates, subjected to the small construction companies, vary from 3500 to 16 000 LTL/mln. LTL. Meantime the construction companies, which employ from 50 to 250 employees, belong to the mid-size companies' class. The overhead costs of these companies vary from 4000 to 17 000 LTL/mln. LTL. Such wide scatter of overhead costs values shows, that the management system and infrastructure of construction companies, depending to the same class, are not homogeneous, so the evaluation of their competitiveness is not proper. Therefore the classification of construction companies according to their competitiveness in the context of overhead costs is essential.

#### 4. Determination of construction companies overhead costs probability density functions

To perform the analysis of the construction contractors' survey results the mathematical statistics was applied. The main statistical characteristics of the relative rates of a construction company's overhead costs as well as their probability distribution, which is used to compare company's competitiveness in the context of overhead costs with the existing in construction market, were determined (Table 2).

After testing the compatibility hypothesis about the normality of distribution by means of the Kolmogorov-Smirnov criteria, it was estimated that the relative rates of a construction company's overhead costs distributes in compliance with the normal law (Table 3). These results were verified also by means of Chi squared criteria: for the overhead costs  $\chi^2 = 0.984$ , Sig. = 0.805; for the administrative costs  $\chi^2 = 1.893$ , Sig. = 0.288; and building facilities' costs  $\chi^2 = 0.448$ , Sig. = 0.503. This allowed the consistencies of normal distribution to be used in the process of overhead costs data analysis. In this way it became possible to evaluate competitiveness of a specific construction company in the context of overhead costs and develop a new classification of construction companies according to the overhead costs of a company.

#### 5. Construction companies' classification according to the competitiveness in the context of overhead costs

According to obtained probability density functions of construction companies' overhead costs relative rates the construction company classification was developed to evaluate the competitive advantages or disadvantages of a construction company in the context of overhead costs. The set of construction companies' overhead costs values is divided into the areas of high and low competitiveness; and construction companies are classified into very competitive, moderately competitive, few competitive, hardly competitive and uncompetitive companies according to the value of overhead costs (Table 4). The classification of construction company competitiveness in terms of overhead costs is performed not only by the means of the minimum  $Pr'_{\min}$ , average  $Pr'_{\text{vid}}$  and maximum  $Pr'_{\max}$  values of construction companies overhead costs, but by virtue of the 25% quartile  $Pr'_{25}$  and 75% quartile  $Pr'_{75}$  values.

The construction company is considered to be a very competitive in terms of overhead costs if the relative rate of its overhead costs falls within the range between the minimum value  $Pr'_{\min}$  and 25% quartile value  $Pr'_{25}$  (Fig. 3). In case of the moderate competitive company the relative rate of overhead costs fits the intermediate value

**Table 2.** Descriptive statistics of the relative rates of overhead costs, administrative costs and building facility costs

Descriptives		Statistics' value		
		Overhead costs	Administrative costs	Building facilities' costs
Mean		94 558.51	79 881.20	2 849.09
95% Confidence Interval for Mean	Lower Bound	88 157.94	2 431.72	74 426.07
	Upper Bound	100 959.08	3 266.46	85 336.33
Median		94 533.29	84 283.97	2 811.00
Variance		901 887 405	655 126 473.62	2 655 748.83
Std. Deviation		30 031.44	25 595.44	1 629.65
Minimum		33 777	31 641.79	498.00
Maximum		164 265	134 166.7	6 600.00
Range		130 487.6	102 524.9	6 102.00
Interquartile Range		43 732.05	43 848.28	2 471.48
Skewness		-0.031	-0.097	0.350
Kurtosis		-0.722	-1.086	-0.799

**Table 3.** Normality test by the Kolmogorov-Smirnov statistics

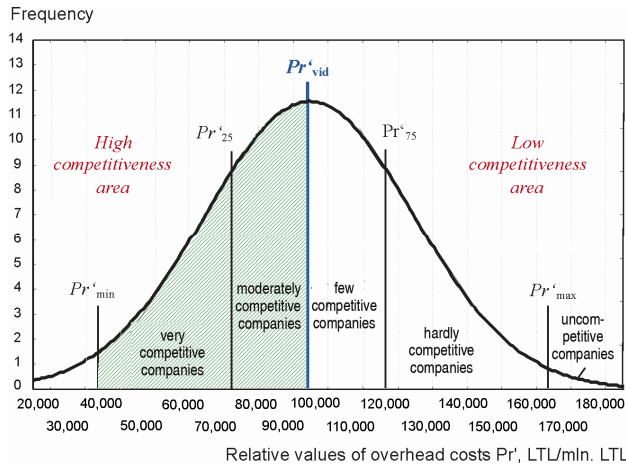
Normal Parameters		Statistics' value		
		Overhead costs	Administrative costs	Building facilities' costs
Most Extreme Differences	Absolute	0.111	0.092	0.102
Kolmogorov – Smirnov Z		0.951	1.033	0.720
Asymp. Sig. (2-tailed)		0.326	0.236	0.678

**Table 4.** Construction companies competitiveness classes according to overhead costs

Competitiveness area	Competitiveness class of construction company	Lower Bound		Upper Bound	
		Statistic	Value, Lt/mln.Lt	Statistic	Value, Lt/mln.Lt
High competitiveness	Very competitive	$Pr'_{\min}$	33 777	$Pr'_{25}$	72 233
	Moderately competitive	$Pr'_{25}$	72 233	$Pr'_{\text{vid}}$	94 558
Low competitiveness	Few competitive	$Pr'_{\text{vid}}$	94 558	$Pr'_{75}$	115 965
	Hardly competitive	$Pr'_{75}$	115 965	$Pr'_{\max}$	164 265
	Uncompetitive	$Pr'_{\max}$	164 265	$\infty$	

**Table 5.** Construction companies competitiveness classes according to administrative costs

Competitiveness area	Competitiveness class of construction company	Lower Bound		Upper Bound	
		Statistic	Value, LTL/mln. LTL	Statistic	Value, LTL/mln. LTL
High competitiveness	Very competitive	$Adm'_{min}$	31 642	$Adm'_{25}$	57 450
	Moderately competitive	$Adm'_{25}$	57 450	$Adm'_{vid}$	79 881
Low competitiveness	Few competitive	$Adm'_{vid}$	79 881	$Adm'_{75}$	101 298
	Hardly competitive	$Adm'_{75}$	101 298	$Adm'_{max}$	134 167
	Uncompetitive	$Adm'_{max}$	134 167	$\infty$	



**Fig. 3.** Classification of construction companies in regard to overhead costs

between the 25% quartile value  $Pr'_{25}$  and the average value of the market  $Pr'_{vid}$ . Very competitive and moderately competitive in the terms of overhead costs construction companies operate efficiently and, as a rule, have a rational business and building facility structures as well as proper management system.

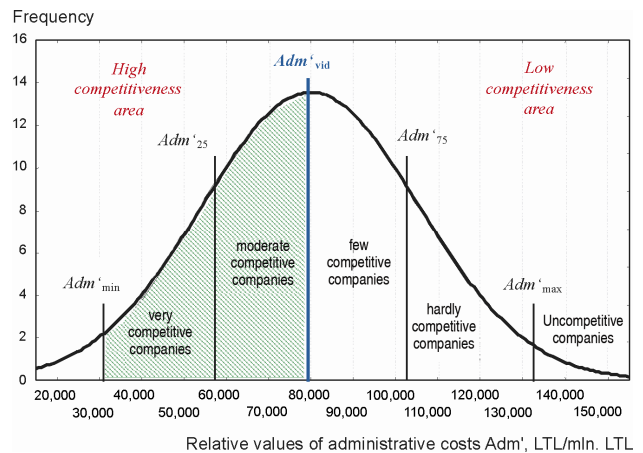
The construction company is considered to be a few competitive in terms of overhead costs if the relative rate of its overhead costs falls within the range between the average value  $Pr'_{vid}$  and 75% quartiles value  $Pr'_{75}$ ; and hardly competitive – when the relative rate falls within the range between 75% quartiles value  $Pr'_{75}$  and the maximum value of the market  $Pr'_{max}$ . The relative value of uncompetitive construction companies is higher than observed in the market maximum value  $Pr'_{max}$ . The low competitiveness of a construction company in terms of its overhead costs can indicate the inefficient use of company's business and building facility infrastructure or inappropriate management system. In this the accomplishment of the audit of a construction company's business system and processes is imperative to reveal the need of management system and/or infrastructure adjustment.

Research of the company's competitiveness by the means of overhead costs alone is often not sufficient for the evaluation of a construction company's competitiveness and management efficiency. Thus, a thorough and sectional analysis of overhead costs components can be valuable. The data gathered during the survey of construction contractors allows to carry out the statistical analysis of overhead costs' elements as well as to assess the competitiveness of a company in the context of administrative and building facilities' costs.

The relative rate of administrative costs is a key parameter, describing the efficiency of the business structure and management system of a construction company. The competitive advantages and disadvantages of a construction company's according to administrative costs are evaluated with the help of the same methodology applied to determine the competitiveness in terms of general overhead costs of a company (Table 5). The classification of construction company competitiveness in terms of administrative costs is performed on the basis of statistically significant relative rates – average value  $Adm'_{vid}$ , minimum  $Adm'_{min}$  and maximum  $Adm'_{max}$  values, 25% quartile  $Adm'_{25}$  and 75% quartile  $Adm'_{75}$  values (Fig. 4).

The set of construction companies' administrative costs values is divided into the areas of high ( $< Adm'_{vid}$ ) and low ( $> Adm'_{vid}$ ) competitiveness. Construction companies can be classified into very competitive [ $Adm'_{min}; Adm'_{25}$ ], moderately competitive [ $Adm'_{25}; Adm'_{vid}$ ], few competitive [ $Adm'_{vid}; Adm'_{75}$ ], hardly competitive [ $Adm'_{75}; Adm'_{max}$ ] and uncompetitive [ $Adm'_{max}; \infty$ ) according to the administrative costs of a company.

The high competitiveness of a construction company in terms of its administrative costs indicates that the business structure of the company is strategically appropriate for business under the conditions of existing market. The low competitiveness of a construction company in terms of its administrative costs evidences about inefficient use of the company's resources. In this case the implementation of company reorganization or the other development strategies can be essential (Ejdzys, Matuszak-Flejszman 2010).



**Fig. 4.** Classification of construction companies in regard to administrative costs

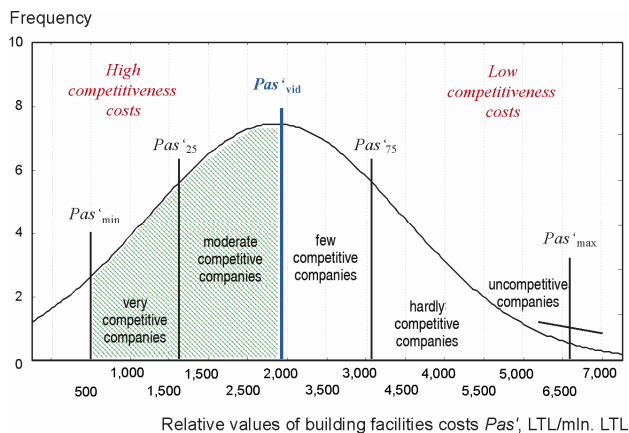


**Table 6.** Construction companies competitiveness classes according to building facilities costs

Competitiveness area	Competitiveness class of construction company	Lower Bound		Upper Bound	
		Statistic	Value, LTL/mln. LTL	Statistic	Value, LTL/mln. LTL
High competitiveness	Very competitive	$Pas'_{min}$	498	$Pas'_{25}$	1 584
	Moderately competitive	$Pas'_{25}$	1 584	$Pas'_{vid}$	2 849
Low competitiveness	Few competitive	$Pas'_{vid}$	2 849	$Pas'_{75}$	4 055
	Hardly competitive	$Pas'_{75}$	4 055	$Pas'_{max}$	6 600
	Uncompetitive	$Pas'_{max}$	6 600	$\infty$	

Another important parameter for the analysis of a construction company's competitiveness and the efficiency of its management is the size of the facilities owned. The relative rate of buildings facilities' costs is analysed in the same way as the relative rates of the general overhead costs (Table 6).

Fig. 5 illustrates the method for evaluation of construction company competitiveness in the context of its building facilities' costs. The range of values of construction companies' building facilities' costs is divided into areas of high and low competitiveness. Construction companies are classified into very competitive [ $Pas'_{min}$ ;  $Pas'_{25}$ ], moderately competitive [ $Pas'_{25}$ ;  $Pas'_{vid}$ ], few competitive [ $Pas'_{vid}$ ;  $Pas'_{75}$ ], hardly competitive [ $Pas'_{75}$ ;  $Pas'_{max}$ ] and uncompetitive [ $Pas'_{max}$ ;  $\infty$ ] according to the building facilities' costs of a company.

**Fig. 5.** Classification of construction companies in regard to building facilities' costs

In the case of very competitive and moderate competitive companies the relative rates of building facilities costs are below the average value in the market ( $< Pas'_{vid}$ ) and they belong to the area of high competitiveness in terms of company's building facilities' costs. It means, that the building facilities of the company are used efficiently and, consequently, the company has competitive advantages in the existing market. When the building facilities' relative values are above the average value in the market ( $> Pas'_{vid}$ ), they can be assigned to the area of low competitiveness. That should be a signal to the company's managers that the real estate of the company is used inexpediently; moreover, both the structure and use of the company's facilities require reorganization.

When the company managers look for competitiveness improvement solutions, they consider cost reduction. Although they should start with company's overhead costs, as in many organizations these costs of production and business are the fastest growing and most wasteful. On the other hand, cutting overhead costs is counterproductive when it undermines the ability of company to grow and compete, or prohibits the employees of the company.

The developed new classification of construction companies according to the overhead costs can be implemented to assess the company competitiveness in the context of its overhead costs and so to evaluate the effectiveness of construction company's management system and business infrastructure. This new classification is proposed to be applied by the determination of the competitive bidding price. The structure of construction bidding price determination model is shown in Fig. 6.

In the first step the relative rates of construction companies' overhead costs, administrative costs and building facilities' costs as well as other parameters of the company are calculated. Another step is the assessment of construction company competitiveness in terms of its overhead costs which is accomplished on the bases of obtained classification of construction companies according to the overhead costs. Company's pertaining to one or another group of competitiveness indicates its competitive advantages and disadvantages in the context of overhead costs. When the company's overhead costs appears to be in the area of low competitiveness, the competitiveness of the company is analyzed in the context of structural elements of overhead costs – in accordance with administrative and building facilities costs. In the case of low competitiveness of construction companies in terms of overhead costs the managers of the company are encouraged to perform the audit of management system and infrastructure.

The developed bidding price determination model can be applied to form the tender price of construction that is competitive in terms of company's overhead costs due to assessing the peculiarities of company's management system and business infrastructure.

## 6. Assessment of the construction company competitiveness in the context of overhead costs (practical example)

The proposed new classification of construction companies can be adapted for the determination of the competitiveness of the specific construction company in the context of its overhead costs. The construction company X

performs general construction works in Kaunas region. Last year the company carried out construction works for 3.6 million LTL with annual overhead costs of 417,475 LTL. The company employs 87 employees, 6 of which belong to the administrative staff. According to these characteristics the company belongs to the homogeneous set of proposed model and can be evaluated in regard to the new classification of construction companies.

In the issue the relative rate of construction company overhead costs  $Pr'_x$  is 115,965 LTL per one million of operational volume. It enters the low competitiveness of the region in the context of overhead costs, namely the interval between the market averages and the highest values of overhead costs relative rates (see Fig. 7). Based on the proposed new classification of construction companies the X company is attributed to the area of low

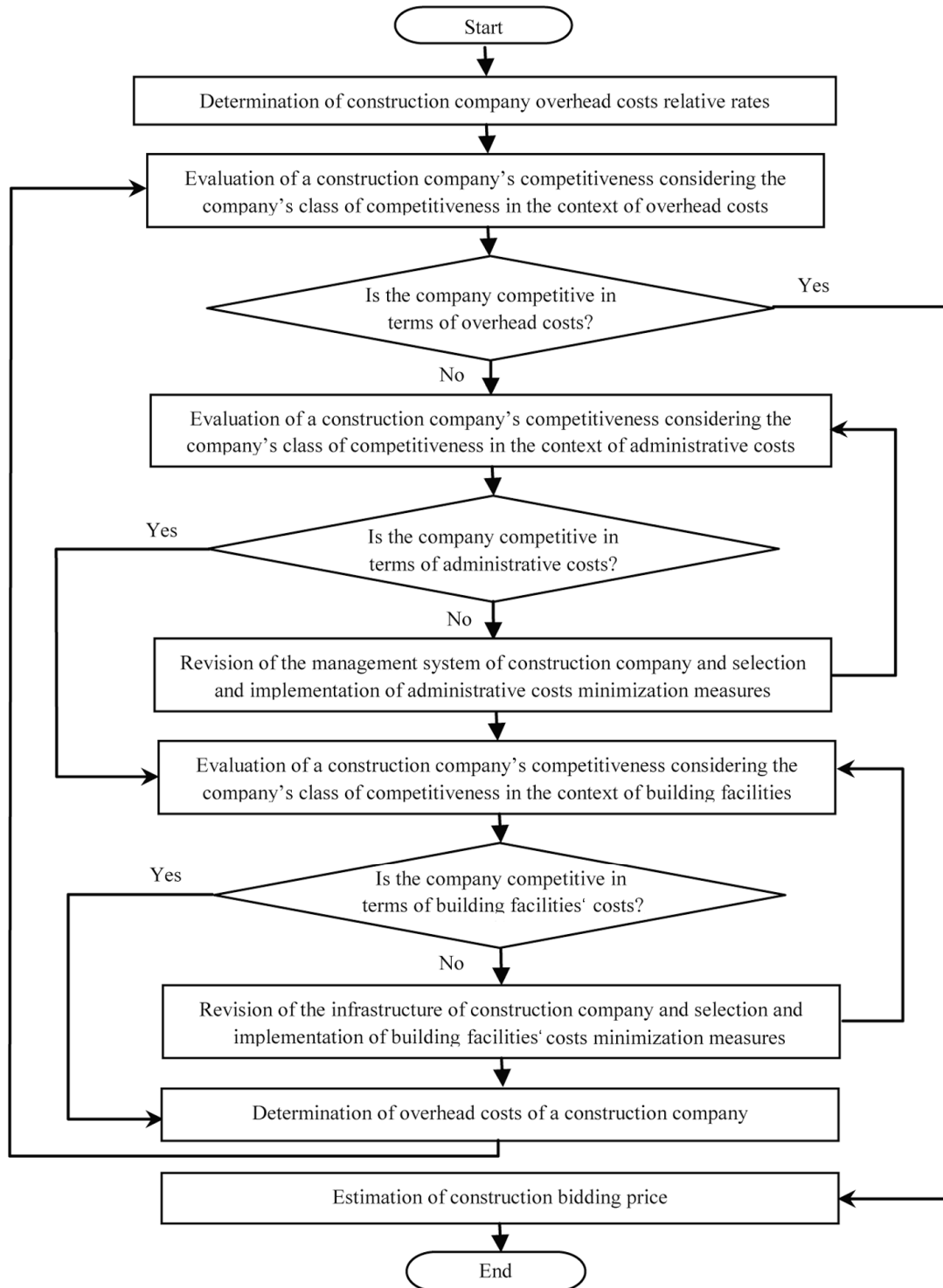


Fig. 6. Competitive construction bidding price determination model

competitiveness. This may mean that the construction company has an ineffective business infrastructure or inadequate management system. In order to achieve a better level of competitiveness it is necessary to rearrange its management system and/or business infrastructure by the adopting of the certain overhead costs cutting measures. In the more detailed analysis the pertaining of construction company administrative and building facility costs to the competitiveness classes is at issue.

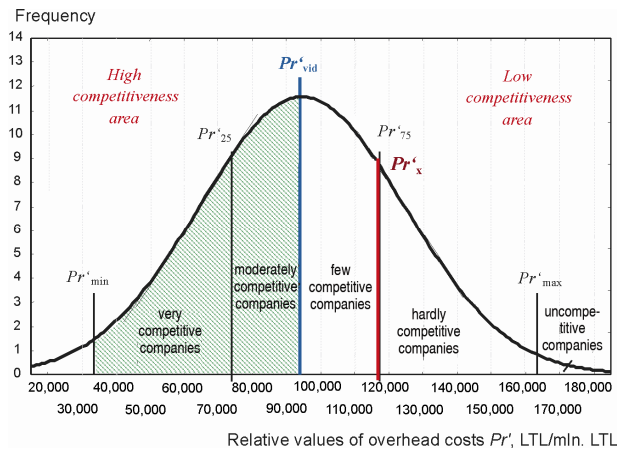


Fig. 7. Assessment of construction company competitiveness in the context of overhead costs

There are six administrative employees in the construction company X, whose wages, taxes, training, transport and other office expenditure needs to be covered annually in the amount of 383,452 LTL. The relative rate of administrative costs of the construction company  $Adm'_x = 106,514$  LTL/mn. LTL falls into the area of low competitiveness, i.e. interval between the market average and maximum values of relative rates of administrative costs (see Fig. 8). Assessing the competitiveness of the company X in the context of administrative costs, it is attributed to the very low competitiveness class. This may mean that the construction company does not have effective management structure or governance system, it has to be reorganized.

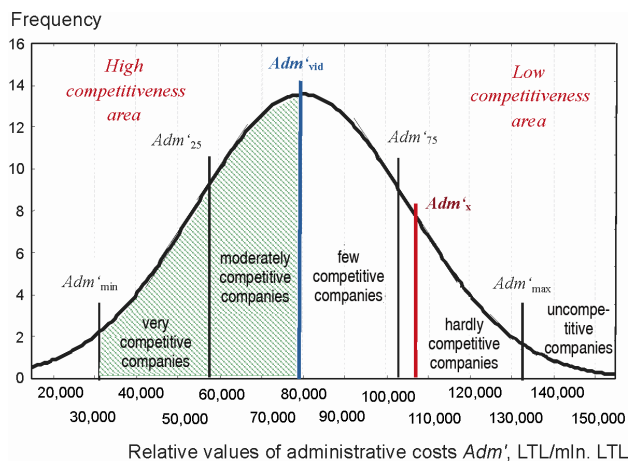


Fig. 8. Assessment of construction company competitiveness in the context of administrative costs

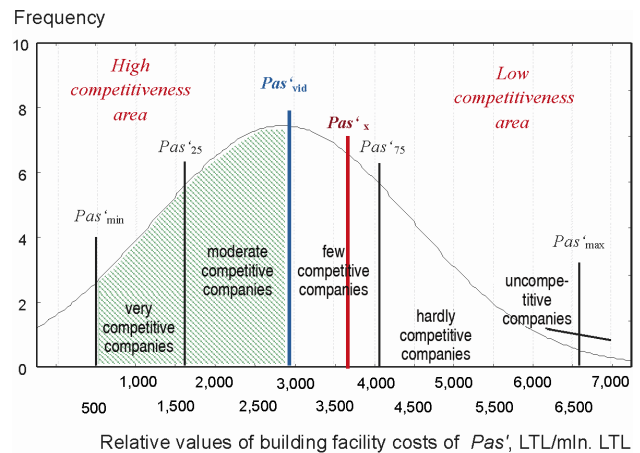


Fig. 9. Assessment of construction company competitiveness in the context of building facility costs

Construction company X holds the existing building facilities of 560 m<sup>2</sup> with buildings maintaining costs of 13,195 LTL annually. All facilities are used in accordance with own needs, so there are no any additional incomes from the rental received. Assessing the competitiveness of the company X in the context of building facilities costs the estimated relative rate  $Pas'_x = 3,665$  LTL/mn. LTL does not get into the area of high competitiveness (see Fig. 9). The considered construction company is assigned to the hardly competitive companies' class. This indicates that the company is not effectively using the existing buildings and there is the need in rearranging facilities and their use.

The considered construction company X is not competitive in the context of overhead costs, because neither the administrative costs, nor the building facility costs bring it a competitive advantage in the market. Therefore both parameters of management system and infrastructure must be minimized in order to increase the competitiveness of the company. Overhead costs cutting measures and the selection of a development strategy are very complex tasks, requiring an involvement of corporate management support specialists.

## 7. Conclusions

1. The analysis of scientific research on the overhead costs of a construction company has revealed that different investigations on overhead costs emphasize a lot of diverse problems, but there is no systematic approach to the evaluation of construction company competitiveness in the context of company's overhead costs.

2. The database of overhead costs and infrastructure characteristics of the construction companies performing general construction work packages in the central regions of Lithuania's construction market was compiled. Upon accomplishing the statistical analysis of survey data the relative values of construction company overhead costs, administration costs and building facility costs as well as their probability density functions were obtained. It was proven statistically that the relative values of overhead, administration and building facilities costs distribute in compliance with the normal law. This



allowed implementing the regression analysis by the modelling of overhead costs.

3. According to the obtained probability density functions of overhead costs relative rates the construction company classification was developed to evaluate the competitive advantages and disadvantages of a construction company in the context of overhead costs. The set of construction companies' overhead costs values is divided into high and low competitiveness areas; and construction companies are classified into very competitive, moderate competitive, few competitive, hardly competitive and uncompetitive according to the overhead costs of a company.

4. The developed methodology for the construction company competitiveness evaluation according to its overhead costs can be implemented and successfully adopted in practice for the establishing of construction company's competitiveness advantages and disadvantages, modelling of overhead costs, analyzing the parameters of company's management system and infrastructure, as well as determining competitive bidding price proposed for construction tenders and procurement.

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## NAUJAS STATYBOS ĮMONIŲ KLASIFIKAVIMAS: PRIDĖTINIŲ IŠLAIDŲ ASPEKTAS

R. Apanavičienė, A. Daugėlienė

Santrauka

Tradicinė statybos įmonių klasifikacija pagal įmonės darbuotojų skaičių nėra korektiška statybos įmonėms analizuoti ir jų konkurencingumui vertinti. Taikant statistinius duomenų apdorojimo metodus išnagrinėti Lietuvos statybos įmonių duomenys ir pasiūlyta nauja statybos įmonių klasifikacija į konkurencingumo klases pagal jų pridėtinių išlaidų santykinio rodiklio reikšmę. Sukurta nauja statybos įmonių klasifikacija leidžia atlikti ekonominių statybos įmonių įvertinimą ir modeliuoti jų konkurencingumą pridėtinių išlaidų aspektu, suformuoti konkurencingą pasiūlymo kainą, įvertinant konkrečius statybos įmonės konkurencinius pranašumus.

**Reikšminiai žodžiai:** konkurencingumas, pridėtinės išlaidos, įmonių klasifikavimas, statybos įmonė.

**Rasa APANA VIČIENĖ.** Associated professor of Civil Engineering and Management in the Dept of Civil Engineering Technologies at Kaunas University of Technology. PhD in Civil Engineering from Kaunas University of Technology in 2002. Main research interests: construction project management, investment projects, strategic management and effectiveness modelling, neural networks.

**Ala DAUGĖLIENĖ.** Lecturer in Faculty of Civil Engineering and Architecture in the Dept of Civil Engineering Technologies at Kaunas University of Technology. PhD in Civil Engineering from Kaunas University of Technology in 2010. Main research interests: costing in construction, bidding and estimating, construction marketing and bidding strategies, and optimization.